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Title : Modeling Manatee Response to Restoration in the Ten Thousand Islands and Everglades National Park

Category : Conservation

Student : Not Applicable

Preferred Format : Poster Presentation

Abstract : We are developing a spatially explicit, individual-based model of the Florida manatee (Trichechus manatus latirostris) in southwestern Florida. This model is being used to project the potential effects of altered hydrologic regimes on manatees in southwest Florida. We are parameterizing this model using telemetry data from 26 manatees tracked between June 2000 and March 2003 in the Ten Thousand Islands area. These manatees showed a consistent pattern of feeding on marine seagrass beds in offshore zones for 1 to 7 days, followed by movements of 5 to 30 km up rivers and canals to access fresh water. A network data structure is used to model this movement between nodes representing destination sites for feeding, drinking, and thermal sheltering, all connected by arcs representing travel corridors. A Markov Chain approach is used to simulate the transition of manatees into different behavioral states that drive the movement patterns of individuals. Virtual manatees are allocated a portion of the total network that includes one or more freshwater sites, thermal refugia, and offshore seagrass beds. Salinities, water temperature, and water depth also are modeled along this network to reflect natural environmental variation and changes due to restoration. Manatees can shift their home range to different parts of the network if fresh water, thermal refugia, or seagrass become unavailable within their home range. These shifts are modeled using a reinforcement model, which controls how manatees respond to changes in the availability of critical resources. Sensitivity analyses are used to evaluate the importance of different assumptions and uncertainty associated with poorly understood model parameters. As additional telemetry data are collected, the model will be refined to incorporate new insights from these data. Radiotracking and aerial surveys will provide an important means of monitoring manatee response to natural environmental fluctuations and human-induced alterations associated with restoration activities.